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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/934,573	08/23/2001	Shuji Ono	3562-0121P	7898

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EXAMINER	
KIM, CHONG R	

ART UNIT	PAPER NUMBER
2624	

DATE MAILED: 08/16/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/934,573	ONO, SHUJI	
	Examiner	Art Unit	
	Charles Kim	2624	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *12 July 2006*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1, 3-11, 14-22* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☒ Claim(s) *15-22* is/are allowed.

6)☒ Claim(s) *1,3-5,8-11 and 14* is/are rejected.

7)☒ Claim(s) *6 and 7* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *23 August 2001* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Response to Arguments

1. Applicant's request for reconsideration of the finality of the rejection of the last Office action is persuasive and, therefore, the finality of that action is withdrawn. However, upon further consideration, a new ground(s) of rejection is made in view of Wechsler, U.S. Patent No. 3,800,307, the details of which are provided below.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

2. Claims 1, 3-5, 10, 11 are rejected under 35 U.S.C. 103(a) as being unpatentable over the combination of Lu, U.S. Patent No. 5,852,672 ("Lu"), Miramonti et al., U.S. Patent No. 6,288,385 ("Miramonti"), and Wechsler, U.S. Patent No. 3,800,307 ("Wechsler").

Referring to claim 1, Lu discloses an image capturing apparatus for obtaining information regarding a depth of a subject, comprising:

a. a capturing section (40) operable to perform image capturing for the subject at a plurality of viewpoints (col. 5, lines 30-55 and figure 2)

b. a controller operable to control the capturing section to perform the image capturing at different timings at the plurality of viewpoints (col. 7, lines 12-25 and figure 6)

c. the controller controls the capturing section to perform the image capturing for the subject two or more times at the at least one of the plurality of viewpoints (figure 6).

Lu does not explicitly disclose that the capturing section includes a single lens section and a single shutter for capturing the subject at a plurality of viewpoints (Note that Lu's capturing section comprises multiple imaging units). However, this feature was exceedingly well known in the art. For example, Miramonti discloses a single capturing section (110) including a single lens section (111) and a single shutter (111) operable to perform image capturing for a subject at a plurality of viewpoints, and a controller to control the single capturing section to perform image capturing at different timings at the plurality of viewpoints (col. 6, lines 5-32 and figure 1C). Miramonti explains that the use of multiple capturing sections arranged at different viewpoints can be interchanged with the use of a single capturing section translated around the subject (figures 1C and 1D).

Lu and Miramonti are combinable because they are both concerned with image capturing devices for obtaining depth information of a subject. At the time of the invention, it would have been obvious to a person of ordinary skill in the art to modify the image capturing section of Lu so that it comprises a single capturing section with a single lens and shutter, as taught by Miramonti. The suggestion/motivation for doing so would have been to enhance the flexibility of the imaging system by providing multiple configurations of the image capturing section. Therefore, it would have been obvious to combine Lu with Miramonti.

Lu and Miramonti do not explicitly disclose that the images are captured by controlling a movement of the lens section from a first position to at least a second position within the single capturing section. However, this feature was exceedingly well known in the art. For example, Wechsler discloses a controller for controlling a single capturing section to capture multiple images at a plurality of viewpoints by controlling a movement of the lens section from a first position to at least a second position within the single capturing section (col. 7, line 50-33 and figure 1).

Lu, Miramonti and Wechsler are combinable because they are all concerned with image capturing devices for obtaining depth information. At the time of the invention, it would have been obvious to a person of ordinary skill in the art to modify the image capturing section of Lu and Miramonti so that the images are captured by controlling a movement of the lens section from a first position to at least a second position within the single capturing section, as taught by Wechsler. The suggestion/motivation for doing so would have been to reduce blurring, ghost perspectives, and other undesirable optical effects (Wechsler, col. 2, line 60-col. 3, line 6). Therefore, it would have been obvious to combine Lu and Miramonti with Wechsler to obtain the invention as specified in claim 1.

Referring to claim 3, see the rejection of claim 1 above. Lu does not explicitly disclose a viewpoint moving system operable to move a position at which the capturing section performs the image capturing for the subject to the plurality of viewpoints.

Miramonti discloses a viewpoint moving system operable to move a position at which a capturing section performs image capturing for a subject to a plurality of viewpoints, and a controller for controlling a capturing section to perform image capturing for the subject at a

plurality of viewpoints successively by moving the position to the plurality of view points (col. 6, lines 5-32 and figure 1C). Therefore, it would have been obvious to combine Lu and Miramonti, for the reasons stated above (claim 1).

Referring to claim 4, Lu discloses an image capturing apparatus for obtaining information regarding a depth of a subject, comprising:

a. a capturing section operable to perform image capturing for the subject at a plurality of viewpoints (col. 5, lines 30-55 and figure 2)

b. a controller operable to control the capturing section to perform the image capturing at different timings at the plurality of viewpoints (col. 7, lines 12-25 and figure 6)

c. the controller controls the capturing section to perform the image capturing for the subject two or more times at the at least one of the plurality of viewpoints (figure 6)

d. a depth calculating unit operable to calculate a depth of a particular region of the subject based on two or more images obtained by the image capturing performed for the subject two or more times at the one viewpoint and another image obtained by the image capturing performed at another viewpoint different from the one viewpoint [col. 7, lines 12-25. Note that the (two or more) time series images (figure 6) are used to obtain time series three-dimensional surfaces (depth) of the subject].

Lu does not explicitly disclose that the capturing section includes a single lens section and a single shutter for capturing the subject at a plurality of viewpoints (Note that Lu's capturing section comprises multiple imaging units). However, this feature was exceedingly well known in the art. For example, Miramonti discloses a single capturing section (110) including a single lens section (111) and a single shutter (111) operable to perform image

capturing for a subject at a plurality of viewpoints, and a controller to control the single capturing section to perform image capturing at different timings at the plurality of viewpoints (col. 6, lines 5-32 and figure 1C). Miramonti explains that the use of multiple capturing sections arranged at different viewpoints can be interchanged with the use of a single capturing section translated around the subject (figures 1C and 1D). Miramonti further discloses a depth calculating unit operable to calculate a depth of a particular region of the subject based on two or more images obtained by the image capturing performed for the subject (col. 6, lines 49-56).

Lu and Miramonti are combinable because they are both concerned with image capturing devices for obtaining depth information of a subject. At the time of the invention, it would have been obvious to a person of ordinary skill in the art to modify the image capturing section of Lu so that it comprises a single capturing section with a single lens and shutter, as taught by Miramonti. The suggestion/motivation for doing so would have been to enhance the flexibility of the imaging system by providing multiple configurations of the image capturing section. Therefore, it would have been obvious to combine Lu with Miramonti.

Lu and Miramonti do not explicitly disclose that the images are captured by controlling a movement of the lens section from a first position to at least a second position within the single capturing section. However, this feature was exceedingly well known in the art. For example, Wechsler discloses a controller for controlling a single capturing section to capture multiple images at a plurality of viewpoints by controlling a movement of the lens section from a first position to at least a second position within the single capturing section (col. 7, line 50-33 and figure 1).

Lu, Miramonti and Wechsler are combinable because they are all concerned with image capturing devices for obtaining depth information. At the time of the invention, it would have been obvious to a person of ordinary skill in the art to modify the image capturing section of Lu and Miramonti so that the images are captured by controlling a movement of the lens section from a first position to at least a second position within the single capturing section, as taught by Wechsler. The suggestion/motivation for doing so would have been to reduce blurring, ghost perspectives, and other undesirable optical effects (Wechsler, col. 2, line 60-col. 3, line 6). Therefore, it would have been obvious to combine Lu and Miramonti with Wechsler to obtain the invention as specified in claim 4.

Referring to claim 5, Lu further discloses a positional difference detecting unit operable to detect a positional difference of an image of the particular region of the subject based on the two or more images obtained at the one view point and the other image obtained at the another view point, wherein the depth calculating unit calculates the depth of the particular region of the subject based on the positional difference [col. 6, line 25-col. 7, line 11. Lu explains that the depth information of the subject (z-coordinate) is calculated based on the detected positional difference (camera parameters) of the two or more images obtained at one view point and the other image obtained at the another view point].

Referring to claim 10, Miramonti further discloses that the viewpoint moving unit is capable of moving the capturing section at three or more viewpoints which are not aligned on one line (figure 1C).

Referring to claim 11, Miramonti further discloses that the viewpoint moving unit is capable of moving the capturing section to a variety of different positions (figure 1C).

3. Claim 8 is rejected under 35 U.S.C. 103(a) as being unpatentable over the combination of Lu, U.S. Patent No. 5,852,672 ("Lu"), Miramonti et al., U.S. Patent No. 6,288,385 ("Miramonti"), Wechsler, U.S. Patent No. 3,800,307 ("Wechsler"), and Bacs, Jr. et al., U.S. Patent No. 6,324,347 ("Bacs").

Referring to claim 8, Lu, Miramonti, and Wechsler do not explicitly disclose that the image capturing section includes a light converging unit operable to converge light incident thereon and a light-limiting unit having at least aperture for limiting a range where the light is allowed to pass, and a viewpoint moving unit that moves the aperture by moving the light-limiting unit, to realize a plurality of viewpoints. Bacs explains that this feature was exceedingly well known in the art (col. 3, lines 23-40 and figure 1).

Lu, Miramonti, Wechsler, and Bacs are combinable because they are both concerned with stereo imaging systems. At the time of the invention, it would have been obvious to a person of ordinary skill in the art to modify the image capturing apparatus of Lu, Miramonti, and Wechsler in view of Bacs' teaching. The suggestion/motivation for doing so would have been to provide an imaging system that is compact in size, light weight, efficient in construction and operation, and convenient to implement in conventional video cameras (Bacs, col. 3, lines 17-22). Therefore, it would have been obvious to combine Lu, Miramonti, and Wechsler with Bacs to obtain the invention as specified in claim 8.

4. Claim 9 is rejected under 35 U.S.C. 103(a) as being unpatentable over the combination of Lu, U.S. Patent No. 5,852,672 ("Lu"), Miramonti et al., U.S. Patent No. 6,288,385

("Miramonti"), Wechsler, U.S. Patent No. 3,800,307 ("Wechsler"), and Lo et al., U.S. Patent No. 6,269,223 ("Lo").

Referring to claim 9, Lu, Miramonti, and Wechsler do not explicitly disclose that the capturing section includes a light-limiting unit having a plurality of apertures for limiting a range where light is allowed to pass, and that the viewpoint moving unit closes at least one of the plurality of apertures to realize the plurality of viewpoints.

Lo discloses an image capturing system that includes a light-limiting unit having a plurality of apertures for limiting a range where light is allowed to pass, and a viewpoint moving unit that closes at least one of the plurality of apertures to realize the plurality of viewpoints (col. 2, lines 13-37).

Lu, Miramonti, Wechsler, and Lo are combinable because they are all concerned with stereo imaging systems. At the time of the invention, it would have been obvious to a person of ordinary skill in the art to modify the image capturing system of Lu, Miramonti and Wechsler, so that it includes the features taught by Lo. The suggestion/motivation for doing so would have been to provide a camera that is simple in design and capable of taking both mono and stereo images (Lo, col. 1, line 65-col. 2, line 11). Therefore, it would have been obvious to combine Lu, Miramonti, and Wechsler with Lo to obtain the invention as specified in claim 9.

5. Claim 14 is rejected under 35 U.S.C. 103(a) as being unpatentable over the combination of Lu, U.S. Patent No. 5,852,672 ("Lu"), Miramonti et al., U.S. Patent No. 6,288,385 ("Miramonti"), Wechsler, U.S. Patent No. 3,800,307 ("Wechsler"), and Moreton et al., U.S. Patent No. 5,835,133 ("Moreton").

Referring to claim 14, Lu, Miramonti, and Wechsler do not explicitly disclose that the controller controls the capturing section to alternately perform the image capturing at two viewpoints three or more times. However, this feature was exceedingly well known in the art. For example, Moreton discloses a controller that controls a capturing section to alternately perform image capturing at two viewpoints three or more times (col. 8, lines 1-29).

Lu, Miramonti, Wechsler, and Moreton are combinable because they are both concerned with stereo imaging systems. At the time of the invention, it would have been obvious to a person of ordinary skill in the art to modify the controller of Lu, Miramonti, and Wechsler so that it controls the capturing section to alternately perform the image capturing at two viewpoints three or more times, as taught by Moreton. The suggestion/motivation for doing so would have been to enhance the imaging process by providing the capability of high resolution image generation (Moreton, col. 8, lines 30-32). Therefore, it would have been obvious to combine Lu, Miramonti, and Wechsler with Moreton to obtain the invention as specified in claim 14.

Allowable Subject Matter

6. Claims 6 and 7 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

7. Claims 15-22 are allowed.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Charles Kim whose telephone number is 571-272-7421. The examiner can normally be reached on Mon thru Thurs 8:30am to 6pm and alternating Fri 9:30am to 6pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jingge Wu can be reached on 571-272-7429. The fax phone number for the organization where this application or proceeding is assigned is 571-272-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

ck
August 3, 2006

SAMIR AHMED
PRIMARY EXAMINER